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Creating Recreation Trail Opportunities Through Timber Sale Design

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CREATING RECREATION TRAIL OPPORTUNITIES THROUGH TIMBER SALE DESIGN

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ABSTRACT

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TITLE: Developing Recreation Trail Opportunities Through Timber Sale Design

ABSTRACT As part of "New Perspectives in Forestry", the Chief of the Forest Service has asked resource managers to develop new ways of practicing multiple use management. Successfully integrating the concepts of recreation management and timber stand treatment to provide an "outstanding" recreation trail experience is explored in this paper. The Bandit Springs Recreation Area on Ochoco National Forest was used as a demonstration area to practice some new forestry concepts. These included creating telemark ski hills through small patch clearcuts, and reducing density in old growth ponderosa pine stands by selection harvest while leaving "fairy rings" of old growth trees. Tractor trails were designed to create cross-country ski trails after timber stand treatment. Trails created will also be used as summer mountain biking and horseback riding trails.

One of the most important elements in designing a trail system in a semi-primitive recreation setting through timber harvest is setting landscape management objectives. This paper reviews landscape management for timber sales and downhill ski areas and applies these concepts to multi-season trail design. It also discusses the concept of "backcountry skiing".

Keywords: Cross-country ski trails, landscape management, summer recreation trails, silvicultural treatments, timber sales, New Perspectives, old growth forests.

EXECUTIVE SUMMARY

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SUMMARY: "New Perspectives in Forestry" challenges forest resource managers to take an ecosystem approach to forest management. The Bandit Springs Recreation Area of Ochoco National Forest in Central Oregon, was used as a demonstration area to practice this ecosystem approach. The objective of this paper was to successfully integrate the concepts of recreation management and timber stand treatment to provide an outstanding recreation experience in a semi-primitive setting. Specifically, the research question was, "Can a quality ski trail be built using timber sale planning in the Bandit Springs area?" An additional question "Can summer hiking, horseback riding, and mountain bike trails be built using timber sale planning?" was also answered.

Since no literature was available on designing trails through timber sale planning, other applicable literature was reviewed. This included information on cross-country ski trail design and construction, summer trail construction criteria, downhill ski area design, landscape management, and silvicultural treatment of insect and disease laden timber stands. These concepts were then applied to designing a recreation trail system in the Bandit Springs area.

The project was designed using a marketing concept. Program objectives, the desired product, price, place, promotion, participants, process of delivery, and the physical environment were all clearly defined. This market analysis defined three basic products to be delivered. These were: (1) the creation of an "outstanding" recreation experience for semi-primitive nonmotorized winter skiing and summer hiking trails, (2) enhancement of forest health, and (3) maintenance of visually appealing old growth character forests. The target market for all these products was publics who enjoy using a semi-primitive recreation area, and specifically, local clubs, the Mount Bachelor Academy, and campers at Ochoco Divide.

This analysis revealed that there is demand for skiing and summer trails in the local area. However, winter demand is met by existing facilities. Therefore any trails designed in the area should be multi-season use trails. Attribute analysis of the Bandit Springs Area also revealed those features which should be highlighted along the trail system.

Timber sale design was used to deliver the product. Forest health of the north-slope fir stands was a major concern. Creation of telemark ski hills through small patch clearcuts achieved treatment of root-rot problems and provided a recreation opportunity. Overstocked old growth ponderosa pine stands were also treated through selection harvest and the leaving of "fairy rings" to retain old growth character. The trail itself was created by flagging the desired route on the ground. The tractor access paths to the timber sale

areas then followed this route. This resulted in creating five miles of multi-season trail entirely through timber sale design.

Landscape management objectives were of particular concern throughout this project design. The author stresses the importance of clearly stating the desired future condition of the forest setting to produce an outstanding recreation setting. Specific landscape management direction to be used in the timber sale layout is given.

In conclusion, the author found that quality ski trails and summer hiking, horseback and mountain bike trails can be built through timber sale design if detailed planning is done at the beginning of the process. The important recreation features such as vistas, variety in vegetation and topography, and wildlife viewing opportunities must first be identified. Next, analysis of forest health is conducted, identifying disease pockets and forest stands in need of thinning. Finally, the timber sale is designed such that the trail is created through skid trail and timber sale unit design.

Recommendations that can be applied to other forest areas included creation of telemark hills, linear clearcuts for trail clearing, vegetative management guidelines for trail maintenance, and visual quality objectives for timber sale design. It was also recommended that another classification of ski trail entitled "backcountry skiing" be created, and further clarification of current cross- country ski trail construction criteria be undertaken.

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INTRODUCTION

Introduction to the Project

> ***"This nation must have alternatives to simple preservation of old growth forests or intensively managed tree farms. We also need to integrate the ecological and aesthetic values of old growth forests into stands that are managed for multiple uses and values."***

This statement made by George Leonard, Associate Chief of the USDA Forest Service (1989) demonstrates the change in perspective and the outstanding challenge facing recreation and forest managers today. "New Perspectives" in forestry, is the newest tool managers have to address public concern about biodiversity and ecological/aesthetic forest management.

The goal of new perspectives is to:

> ***"Manage forests to balance values and produce a sustained supply of goods and services. We need a new approach to managing our resources that goes beyond merely reacting to resource crisis and concerns. Taking an ecosystem approach, the program focuses on the middle ground between emphasis on timber production and preservation. This program includes concerns for....recreational and aesthetic values"(USDA, 1989).***

New Perspectives empowers managers to try "non-traditional" forest harvest techniques that help maintain forest structural diversity.

Non-traditional, intensive, innovative management of our national forests is needed. During the last round of National Forest Management Planning it became apparent that the public had multiple expectations for each piece of land. As a result each acre of forest is now zoned and layered with multiple expectations of products including recreation, aesthetics, wildlife, timber production, and socio-economic values. Innovative solutions are needed that balance these resources with long term forest health.

For example, the Bandit Springs Recreation Area, was designated in the Ochoco National Forest Land and Resource Management Plan (LMP) of 1989 as a recreation area, a visual resource management area, and was also counted in the Assigned Sale Quantity of the Forest. This old growth ponderosa pine and white fir forest presently has eleven miles of cross-country ski trail, a ski shelter, and a sno-park. More winter and summer recreation opportunities are desired by the local publics. Additionally, some timber management is needed to eliminate threat of insect and disease that could destroy the visual qualities the agency is attempting to preserve. Feelings run high among the local publics concerning timber management practices that may be used to control insect and disease damage.

Current forest Timber Stand Exams show outbreaks of mountain pine beetle, dwarf mistletoe, and laminated root rot in the Bandit Springs area. In 1984, Halfway Timber Sale was proposed in this area to manage forest insect and disease problems, to increase stand vigor, and to produce timber. The sale was withdrawn in 1986 because it was not sensitive to visual resource management or winter recreation opportunities. The Big Summit Ranger District feels there is still a need to provide more winter and summer recreation opportunities and to manage the forest stands due to insect and disease damage.

Problem Statement

In order for resource managers to balance different demands on the same piece of forest, they need to become three dimensional artists. Providing an outstanding recreation experience while manipulating forest vegetation and producing timber products is truly challenging. When was the last time someone set out to have an "adequate" recreation experience? Often this is just the type of experience we are offering our nordic skiers on national forest lands in the Pacific Northwest. People will ski just about anything that has snow on it if that is all that is available. We find them skiing old logging roads and hiking trails, neither of which were designed for that purpose. Since they are using these areas, managers put up blue diamonds and a bulletin board and call it a ski trail. Though these trails may be fun for some more experienced skiers they often do not meet standard ski trail design criteria and the visitor has an "adequate" experience. Considering all the time, information and expertise that goes into designing these logging roads and summer trails, it takes just a bit more effort and planning to also create an "outstanding" recreational ski experience.

The Bandit Springs area is to be managed for a semi-primitive nonmotorized recreation experience. People come to this area expecting a quiet, inspiring experience in an old growth ponderosa pine setting. Resource managers have a wide variety of tools and techniques they can employ to manipulate the forest setting. Timber harvest can include even and uneven-aged concepts, landscape modification can be heavy or gentle, and recreation trails can range from a 12" wilderness trail to a 20' groomed ski trail. This project proposes to find a workable palette of resource management tools and techniques to answer the following question:

How can forest resource managers successfully intergrate the concepts of recreation management and timber stand treatment to provide an outstanding recreation experience at Bandit Springs Recreation Area?

Specifically; Can a quality ski trail be built using timber sale planning in the Bandit Springs area?
and,
Can summer hiking, horseback riding, and/or mountain bike trails be built using timber sale planning?

Study Objectives

Using the Bandit Springs Winter Recreation Area on the Ochoco National Forest as a demonstration area, the objectives of this project are:

1. To design a cross-country ski trail system that will accommodate a variety of skill levels.

2. To recommend cross-country ski trail construction guidelines that allow managers to create trails through timber sale plannning.

3. To design telemark and sled hill areas.

4. To determine which summer recreation uses can occur on nordic ski trails constructed through timber sale design and meet the visitors expectations for a semi-primitive nonmotorized experience.

5. To summarize and evaluate silvicultural techniques currently being used to develop cross-country ski trails.

6. To recommend vegetation management in the old growth ponderosa pine forest that will increase resistance to mountain pine beetle and drought.

7. To recommend vegetation management techniques in diseased and unhealthy mixed conifer stands that will improve forest health.

8. To recommend vegetation management within the area that will produce timber volume while maintaining old growth forest characteristics.

Overview

The next chapter will review literature on recreation planning, nordic trail planning and design, telemark and downhill ski design, landscape management, and, silviculture treatments for ponderosa pine and mixed conifer forests. This will reveal the tools and techniques available to create an outstanding recreation experience at Bandit Springs while simultaneously addressing insect and disease problems.

Chapter III, Methodology, will explain how the project was designed in the Bandit Springs area. Chapter IV, Results will give detailed application of timber sale and trail planning design principles as applied in the Bandit Springs area, and the final Chapter will draw conclusions that allow recreation managers to apply these principles to similar project areas.

CHAPTER II
LITERATURE REVIEW

Although the literature review for this project found no specific articles on designing cross-country ski trails through timber sale design, inferences can be made by reviewing literature on recreation planning, cross-country skiing, telemark and downhill ski design, landscape design, and silvicultural treatment for controlling insect and disease problems.

Proper recreation planning follows a basic marketing strategy. Researching market information such as demand for the product, land use allocations, project objectives, and how to offer the product are all very important (FSH 2309.18, Pekuri, Ontario Ski Council). Syme (1989), suggests following the concept of the seven "P's". These are: (1) defining the product, (2) price, (3) place, (4) promotion, (5) participants, (6) process of delivery and (7) the physical environment. Using these concepts as a framework, the product of cross-country skiing will be reviewed, as well as tools for delivering the product including lanscape design and timber harvest methods.

Nordic skiing is an umbrella term encompassing activities including telemark, cross-country, track, and skate skiing. Cross-country skiing occurs in less developed areas and is pursued for both exercise and the pleasure of being outdoors in the winter (Woodward). Telemark skiing is similiar to downhill skiing but uses longer skies and free-heeled boots.

After defining the product, planners must assess if there is demand for the activity. If there is demand, what type of experience do people desire (Cuerdon, Jensen, Frado, Ontario Ski Council)? Participation in cross-country skiing has actually leveled off or declined nationwide in the last 10 years. American Ski Association stastics reveal that the overall decline in use is a result of increased equipment and track fee costs (Kendall 1991, Woodward 1991). However, the Pacific Northwest has shown a slight increase in use. In particular this increase has occured in backwoods, cross-country skiing . Dick Kendall, a nordic ski consultant and Forest Service Master Performer, feels that those over 45 years of age (whom he call "silver striders"!), are one the fastest growing groups.

Cross-country skiing is a family sport. Experiences people seek include: (1) peace and quiet, (2) scenery, (3) companionship, (4) to observe wildlife, (5) to ski per se and (6) for enjoyment (Marshall). A study of cross-country skiers in Minnesota examined motives for pursuing this sport. These included: (1) exercise, (2) experiencing nature, (3) achievement, (4) social contact, (5) escaping pressures and (6) family solidarity (Ballman). This study profiled the "average" skier as 31 years of age, 56 percent female and 44 percent male, with some college education and an income over $20,000 (1978 dollars).

Determining land use allocations for the area where the recreation product will be produced is critical. Are the publics demands in harmony with planned land use or would their desires be better accomodated elsewhere (Jensen)?

Once it is determined that land use allocations and demands mesh, research the areas snow history. Is there enough reliable snow to make a viable nordic ski program (Jensen, Pekuri, Raab)? The area should recieve at least 3 months of reliable snow with at least 4"-23" (Ontario Ski Council).

Trail Planning and Design

Based on standard nordic trail criteria (see FSH 2309.18) assess the feasibility of locating a trail in the area (Frado, Jensen, Ontario Ski Council). Also evaluate your own resources. If there is demand, the natural resources, and the manual resources, begin planning the trail (Jensen). Walk the area over carefully, taking note of topography, variety, outstanding features and visual quality. At this point in planning it is very important to formulate the ski program goals and objectives. "The goals and objectives serve as a framework for both subsequent planning and actual area operation"(Wickens). The Recreation Opportunity Spectrum, where the desired recreation experience can range from a wilderness type experience in a primitive setting to an urban oriented experience with many facilities can be used in recreation planning (USDA Forest Service, 1986). The desired physical, social, and managerial settings of a given area can be used to describe the type of recreation experience offered.

Trail design is an art form. It requires meeting both technical and aesthetic design criteria. John Frado, a professional nordic trail designer explained:

> **"Trails should have the same kind of flow as musical symphonies, except that instead of using sound, the trail builder works with light and shadow, open and closed areas, varying them to create a work of art."** (Frado).
>
> **"Mere mileage is not enough, it's the skiability, the quality, not the quantity of trails that counts."** (Wiggen).

Basic difficulty levels of skiing should be met. This includes a trail system with 25% easiest, 50% more difficult, and 25% most difficult trails (Pekuri). In addition, each trail should basically consist of 1/3 uphill, 1/3 downhill, and 1/3 relatively flat trail (Pekuri, FSH 2309.12, Ontario). Beginner trails should be closest to the trailhead and more advanced trails loop off of these. Trails should always loop back to where they started (Helleiner, Ontario Ski Council, Wickens, Wiggen). There are many other technical trail criteria, which varied slightly depending on the source. These criteria are summarized in Table 1. When designing the trail, also consider possibilities for multi- season use. Table 2 summarizes construction criteria for both summer and winter trail design.

In addition to basic trail design the recreation setting should be considered. In areas such as Bandit Springs, which is managed for a Recreation Opportunity Spectrum (ROS) of semi-primitive nonmotorized, the trails should be fairly narrow and natural appearing. People using this area are seeking solitude, challenge, and a natural environment (Ochoco LMP).

Aesthetic trail design requires an artistic touch. Skiers are looking for a "motion" experience as well as a visual experience. (Helleiner). Allowing the skier to develop a diagonal stride for a period of time puts rythm into their skiing experience. Additionally, by identifying vistas, scenic variety, rock outcrops, meadows, thickets, creeks, historic structures (Cuerdon, Cuyler, Ontario Ski Council, Frado) lakes, clearcuts, and unique trees (FSH 2309.18) the visual experience is enhanced. Frado even suggests creating framed views for picture taking. This gives the area additional advertisement as friends show their pictures to others.

The trail should fit the contours of the land and blend in naturally. It should avoid areas that will cause construction or skiing difficulty including: (1) south or southwest facing slopes, (2) long sidehill traverses over 7%, (3) large outcrops that won't get covered with snow, (4) fences, (5) plowed roads, (6) windy areas (Wiggen, Christiansen), (7)ecologically sensitive areas, (8) swamps, (9) wet areas, (10)icy crossings, and (11) avalanche areas (Jackson, Ontario Ski Council).

Specific construction techniques used in development of private east-coast nordic centers are detailed in articles by Frado, Christiansen, Cuerdon, and Cuyler. Basic considerations include a gentle hand on the

Table 1. Comparison of Cross-Country Ski Trail Construction Guidelines

Author	Easiest (Beginner) trail standards							
	Maximum Pitch	Maximum Sustained Pitch	Pitch Length	Turning Radius	Clearing Width	Tread Width	½ day Ski (miles)	Full day Ski (miles)
Frado, 1988					15-20'	12'		
Christiansen, 1978						5-6'		
Ontario Ski Council, 1980	10%	12-15%	328'	--	13-20'	5'		
Pekuri, 1985	10-15%	5-8%	--	10'	6-8'	6'	3.1	6.2
FSH 2309.18, 1985	10%	7.5%	300'	10-13'	6-8'	--	3.2	6.4

Table 2. Comparison of trail construction standards for cross-country ski, mountain bike, horse, and hiking trails (from FSH 2309.18).

	Easiest trails				More Difficult trails				Most Difficult trails			
Trail criteria	x-c ski	Mt.bike	horse	hike	x-c ski	Mt.bike	horse	hike	x-c ski	Mt.bike	horse	hike
Grade Maximum pitch	10%	10%	15%	20%	--	30%	25%	30%	--	+30%	+30%	+30%
Maximum sustained pitch	7.5%	5%	--	--	12%	10%	--	--	17%	15%	--	--
Length	300'	100'	200'	100'	300'	300'	300'	300'	300'	500'	500'	500'
Turning radius	10'	6'	5'	2-4'	--	3'	5'	2-4'	--	2'	5'	2-4'
Clearing width	13'	4'	8'	4'	8'	3-4'	6'	3-4'	6-8'	3'	3-4'	3'
Clearing height	*	8'	10'	8'	*	8'	8'	8'	*	8'	8'	8'
Tread width	--	24"	24"	18-24"	--	12-24"	24"	12-18"	--	12"	18"	12"
Type of surface	Natural snow	smooth	dirt	dirt	snow	rough	--	--	snow	varied	varied	varied

* 6' above maximum snow depth.

land, conserving soil and rock for other areas of the trail where needed, use of tractors and cats to level the clearing, outsloping and providing drainage structures.

Telemark and Downhill Ski Design

Telemark skiing is a popular activity for more advanced nordic skiers. Even beginning nordic skiers find a thrill by heading down a steep slope. Adding opportunities for this experience within the nordic ski area can diversify the experiences offered. From this authors personal experience, slopes of 10-25% can be skied by beginners provided there is a wide clearing at the bottom for stopping (and falling!). Chris Jensen, Recreation Planner on the Oakridge Ranger District, Williamete National Forest, advises that telemark hills should be open areas with gradients of 15-45%. They should be oriented at right angles to the slope contour and be located on north or northwest aspects. One-third to one-half the area should remain timbered for snow and wind control and aesthetics. (Jensen).

Alpine (downhill) ski design concepts can be used to design telemark runs for beginning and advanced nordic skiers. Basic design considerations include: (Jensen)

1. Runs that are perpendicular to the slope contour
2. Clearing widths of 80-200 feet depending upon grade
3. Grade of 15-45%
4. Wind protection - leave patches of trees to protect skiers from prevailing winds that are cold but not strong enough to cause windthrow
5. Feathering the edges of the cut including leaving single trees within cleared slopes
6. Wide cleared areas at the bottom of runs for stopping
7. Leave islands of trees on flat areas
8. Create an unobstructed line to ski, and
9. Avoid terminating advance runs into beginner runs.

The National Forest Landscape Management Handbook for Ski Areas [Vol 2(7)] provides additional insight into design considerations for downhill ski runs. These concepts can also be applied to development of telemark ski runs and cross-country ski trails. The runs can be shaped and natural openings used to minimize a straight-line effect. Feathering and scalloping of edges, thinning, and the creation of natural appearing openings can be achieved to blend in with the natural openings and character of the park-like ponderosa pine forest.

Frado applied these concepts at a private nordic center in Conneticut by creating "terrain gardens". These gardens are small patch clearcuts for snowplay and telemark skiing. Not only do they add to the diversity of the ski experience, they also increase the capacity of the trails (Frado 2).

Landscape Design

Basic Forest Service Landscape planning suggests describing the characteristic landscape in terms of form, line, color and texture. Analyzing the landscape and highlighting outstanding features, adding to diversity, and framing views are just a few of the basic techniques employed. "Understanding and use of these principles helps the land manager analyze (1) the characteristic landscape and (2) the visual impact of proposed management practices" (USDA Forest Service,1973). These tools form the artists palette of landscape design and should allow the type of artistic work Frado encourages in trail design.

Two vegetative management plans, one for a downhill ski area and one for a campground were reviewed to outline basic considerations that would also apply to trail design (Mt. Hood National Forest, Umatilla National Forest). First, clearly state the vegetative management objectives and desired future condition. If necessary, zone the area into vegetation management zones. For example, zones may include the trailhead, the trail through a meadow, and the trail through ponderosa pine forest. Concerns that need to

be addressed are: public safety, views, perpetuation of a healthy, beautiful forest, and overall enhancement of the recreation experience. The goal of this narrative is a long range program that enhances vegetative benefits and reduces or eliminates the liabilities.

Forest Timber Stand Management

Ponderosa pine forests such as those at Bandit Springs are well described in the National Forest Landscape Management Handbook Volume 2, on Timber. "The primary visual characteristic associated with ponderosa pine is a concept of relatively large, yellow-bark trees in an open, park-like setting". These trees and their associates can grow to large (30-40" dbh) diameters when stocking is controlled. Fire is a critical natural element that eliminates most of the brush and competing vegetation to retain the open park-like stands. Jimmy Walker, Fuels Management Specialist, suggests that when fire is eliminated, fir species will grow under these stands (Walker, 1990). Suppressed fire allows a larger than natural population of insect and disease. Reducing the stocking levels and eliminating some areas of fir regeneration will help bring the stand back into it's natural and vigorous condition (Maffei).

The Bandit Springs area was visited by Forest Service Entomologist Andris Englitis and Pathologist Helen Maffei. They determined the presence of insect and disease problems. On the north slope fir stands they found laminated root rot, Indian paint fungus, spruce budworm, Douglas-fir beetle and the fir engraver beetle. Within the ponderosa pine stands they found a relatively healthy forest with some evidence of dwarf mistletoe and the Ips engraver beetle. Since these were the primary problems found in the area a short summary of recommended silvicultural treatments follows.

Fir engraver beetles are shiny black, 1/8" long, squat beetles with a pronounced ventral declavity. They fly in summer and infest trees that are under stress. They show a marked preference for root disease-affected trees. Sometimes they will "strip attack" a tree, killing cambium on only a portion of the stem or top of the tree. Controlling root disease can alleviate the problems caused by these beetles (Goheen).

Indian paint fungus are airborne pathogens that colonize a branch stub and can remain dormant for many years. They become activited when additional stress is placed on the tree. Losses caused by this fungus are greatest in severly wounded, released white-fir understories on north facing slopes (Goheen). Favoring more disease resistant species such as Douglas-fir, western larch, and ponderosa pine can help regenerate the stand. "Management of unthrifty, suppressed white fir understories and maintenance of older fir stands with many wounded trees should be avoided at all costs."(Goheen)

Western spuce budworm is a major defoliator of Douglas-fir and white fir on the Ochoco National Forest. Adults are mottled gray moths about 1/2" long, fly in late July, mate and lay eggs on the underside of needles. After eggs hatch, the larvae lie dormant until spring. When they become active they bore into old needles and developing buds to feed. These needles and buds become brown and fall off. Budworm outbreaks result in growth loss, top-kill, deformity, and sometimes mortality. Recommended management for controlling spruce budworm involves favoring pines and larches or suppressing high populations of budworm with chemical or biological agents (Goheen).

Dwarf mistletoe is host specific. The species that grows on ponderosa pine will not grow on white fir and vice-versa. Mistletoe spread by discharging seeds from mature female plants, the seeds falling into the crowns of other host trees. The seed then germinates and produces an infection that grows into the host. It can induce abnormal growth in trees resulting in "witches brooms". Control can be attained by converting infected stands into nonsusceptible tree species or using a regeneration harvest (clearcut, shelterwood or seed tree cut) (Goheen). Maffei also suggests that this disease can be controlled by removing the heavier infestation pockets in the overstory before the seeds fall into the understory.

Laminated root rot is a fungus that infests the roots of fir trees and spreads through the soil via the roots. Once introduced into a fir stand the disease continues to spread, especially in overstocked or overmature

stands. The disease remains in the soil even when the tree is harvested since it lives in the roots. Clearcutting disease pockets and replanting with a different species such as western larch or ponderosa pine is the preferred treatment (Giannettino).

There is clearly an abundance of literature regarding planning a recreation ski trail, alpine ski runs, landscape design, and treating insect and disease. The Bandit Springs area offers the opportunity to apply these concepts and create a "New Perspective" on the compatibility of recreation and timber harvest. The areas old-growth ponderosa pine and mixed conifer forests, open meadows and scenic vistas create a very desirable semi-primitive recreation setting. There is a high probability that other people will not be encountered and the visitors own skills are required to fully enjoy the area. In the next chapter we will pull all these concepts together to produce the potential for an "outstanding" nonmotorized recreation experience at Bandit Springs.

CHAPTER III
METHODOLOGY

Project Design

Basic marketing theory as presented by Syme (1989) and others (Jensen, Frado, Ontario Ski Council), was used as a framework for organizing this project. The first two steps involved accessing demand and setting objectives. Demand for cross-country skiing and summer hiking was assessed through review of public comments recieved by Big Summit Ranger District over the years, public comment recieved during the Ochoco National Forest LMP process, and meetings with the Ochoco Winter Sports Committee. A winter recreation use sampling plan and survey form were also designed (see Appendix A). Due to lack of snow for all but three weeks of the 1990-91 winter season the survey was not administered.

Program objectives were formulated by discussions with internal and external publics. Concerns for forest health, landscape management, and recreation opportunities were repeatedly expressed. These concerns were used to develop eight project objectives.

The next step of project analysis described the product, price, place, promotion, participants, process of delivery, and physical environment as explained by Syme (1989).

Three major products were desired from this project. The major focus was creation of an "outstanding" recreation experience for semi-primitive nonmotorized winter skiing and summer hiking trails in the Bandit Springs Recreation Area of Ochoco National Forest. An "outstanding" recreation experience includes vistas; variety in vegetation, landform, and the skiing experience; and opportunities for wildlife viewing and interpretation. The other two desired products were enhancement of forest health within the project area and creation of a visually appealing old-growth character forest. These products were defined by reviewing desired future condition, forest standards and guidelines in the Ochoco National Forest Land and Resource Management Plan, and reviewing objectives of the National Recreation Strategy. Further definition of the product came from analyzing public comments on the old Halfway Timber Sale planned in the Bandit Springs area and comments recieved during the Land Management Planning Process in 1989.

The product was designed for a particular market segment. This information was gathered by talking with people who already use the area and have worked with the Ranger District recreation staff over the years. Literature concerning the characteristics of cross-country skiers and hikers was also reviewed. Further clarification of the audience and their desired product was gained through several ski trips to similiar areas.

The price of this product was difficult to set for the government/public sector. Although there are no plans to charge visitors for skiing or hiking in this area there are costs associated with developing these facilities. This part of the market analysis will be addressed in the Marks Creek Environmental Assessment, Environmental Consequences, planned for completion by June 1992.

Place was easily defined by the Ochoco National Forest Land Management Plan, and the publics desire to have an easily accessible cross-country ski area at Bandit Springs.

Promotion of the product is an ongoing process. It began by involving an interdisciplinary team on the Big Summit Ranger District of Ochoco National Forest to identify issues and concerns in the Bandit Springs Area. This involved silviculture, landscape, timber, logging systems, and recreation specialists. This process established ownership within the agency. By reviewing why the Halfway Timber Sale planned in the area was withdrawn, further insights into unacceptable products were revealed. Basically harvest of old-growth timber that would detract from the character of the area would not be acceptable.

Promotion outside the agency involved monthly meetings with an ongoing Winter Sports Group comprised of local ski, ATV and snowmobile representatives and a representative from the Prineville Tourism Commit-

tee. Other promotion not directly related to this project has included articles in local newspapers about the recreation opportunities in the area, publication of a nordic ski brochure (see Appendix B), and a feature story on Bend local TV Channel 21.

Participants included the local Prineville Nordic club, cross-country skiers in the central Oregon area, and various specialists in both silviculture and recreation within the Forest Service. In addition, the Oregon State SnoPark Committee was involved in 1989-90 to fund development of a State SnoPark at the Bandit Springs State Rest Stop. The SnoPark was operational for the winter of 1990-91.

The product delivery was defined as designing a cross-country ski trail and summer use trail system through timber harvest. It involved clearly defining all the silvicultural and recreational objectives and meshing these to deliver the recreation experience desired in the Bandit Springs area.

Definition of the physical environment was accomplished by gathering all available resource information. This included the following:

1. Field verification of Forest Timber Stand Exam data.
2. A site visit by Helen Maffei, Forest Pathologist.
3. A site visit by Andrei Englitis, Forest Entomologist.
4. Many site visits by District Silviculturist, Nick Giannettino.
5. A site visit by the Forest Landscape Architect, Alan Redman.
6. Many site visits with District Logging Engineer, Larry Friesen.
7. A site visit by Phil Raab, Regional Master Performer for nordic trails.
8. The literature review summarized in Chapter II of this document.
9. Purchase of large scale (1:300) topographic mapping of the area.
10. Detailed analysis of the areas physical attributes.
11. Definition of other attributes in the local area.

Achieving the Objectives

Eight objectives were defined for the project area. Four dealt with recreation management and four with vegetative management and forest health. The overall goal was to use the Bandit Springs Recreation Area as a demonstration area for "New Perspectives" in forestry. The desire was to show the public that Forest Service Resource Managers can deliver multiple products from the same piece of forest and still retain the desired forest character.

A summary of how each objective was achieved follows:

Objective 1
To design a cross-country ski trail system that will accomodate a variety of skill levels.

Objective 2
To recommend cross-country ski trail construction guidelines that allow managers to create trails through timber sale planning.

Objective 3
To design telemark and sled hill areas.

Objective 4
To determine which summer recreation uses can occur on nordic ski trails constructed through timber sale design and meet the visitors expectations for a semi-primitive nonmotorized experience.

These objectives were achieved by flagging a trail system in the Bandit Springs area. Maps, aerial photos, a previous study by Wick (1983), and field reconnaisance were used. The attributes of the Bandit Springs area that contribute to its scenic and recreation values were defined and mapped. I attempted to weave the trail through all the significant features. Areas to avoid, such as south-facing slopes, wet meadows and critical wildlife habitat were also mapped. Trail standards for skiing, hiking, mountain bike riding, and horse riding were compared. This analysis allowed me to define which types of recreation experiences fit the various trail standards. It also helped define the final recreation product in terms of the Recreation Opportunity Spectrum (ROS) and Visual Quality Objectives.

Objective 5
To summarize and evaluate silvicultural techniques currently being used to develop cross-country ski trails.

Objective 6
To recommend vegetation management in the old-growth ponderosa pine forest that will increase resistance to mountian pine beetle and drought.

Objective 7
To recommend vegetation management techniques in diseased and unhealthy mixed conifer stands that will improve forest health.

Objective 8
To recommend vegetation management within the area that will produce timber volume while maintaining old-growth forest characteristics.

Objectives 5-8 were operationalized by reviewing forest stand exams for the area, mapping insect and disease pockets, reviewing literature on silviculture treatment, and visiting the area with various forest specialists. Three similiar projects were also visited to analyze and compare techniques used to balance timber harvest with ski trail construction. These included the Scweitzer Ski trail on the Idaho Panhandle National Forest, Santiam Pass on the Williamete National Forest, and Swampy Lakes Ski area on the Deschutes National Forest. I also skied trails on the Mt. Hood National Forest that were not constructed through timber harvest. This allowed me to visualize the physical characteristics of ski trail and landscape design that would be desirable in the Bandit Springs area.

I talked extensively with many Forest Service employees who have attempted or wish to attempt similiar projects on their forest. There insights into what types of silvicultural treatment, logging systems, and trail design will work together were extremely helpful. These people included:

Steve Brady, Resource Assistant: Sandpoint Ranger District, Idaho Panhandle National Forest,
Mollie Chaudet, Environmental Coordinator, Bend Ranger District, Deschutes National Forest,
Art Currier, Timber Management Assistant, Big Summit Ranger District, Ochoco National Forest
Chris Jensen, Recreation Planner, Oakridge Ranger District, Williamete National Forest,
Al McPhearson, Resource Assistant, Sisters Ranger District, Deschutes National Forest
Phil Raab, Resource Assistant: McKenzie Ranger District, Williamette National Forest and
Mike Zimmerman, Timber Sale Officer, Bend Ranger District, Deschutes National Forest.

CHAPTER IV
RESULTS AND DISCUSSION

Trail and Forest Health Objectives

For any program to be successful the objectives must be clearly stated. There were eight objectives for this project. The Bandit Springs area was used to demonstrate how these objectives produced a "New Perspective" for Forest Management where recreation and timber harvest goals could both be met. Landscape considerations and retention of the forest's old-growth characteristics were of utmost importance. In addition, I knew we had to harvest enough timber that the project was economically viable. The only other alternative would have been to pay a contractor approximately $10,000 per mile to construct the trail. Forest Health objectives would not have been achieved.

Defining the Market Segment

District records of cross-country ski and hiking use in the Bandit Springs area are sketchy. Recreation Information Management (RIM) records for 1988-1990 reported 450 Recreation Visitor Days for skiing in 1988, 300 RVDs for 1989, and 304 RVDs for 1990. Estimated ski use for the 1990-91 season was 50 RVDs. Summer recreation use is estimated at about 800 RVDs annually for picnicking, and 400 RVDs annually for dispersed camping. Other uses that occur include deer and elk hunting (no use figures) and summer hiking (less than 100 RVDs annually). Winter use figures are low due to the drought in central Oregon and lack of snow the last two winters. Use of summer trails is low because there are no marked or advertised trails.

The existing 11 miles of cross-country ski trail and the SnoPark which can accomodate 15 cars are underutilized in the winter. Winter capacity is estimated at 60 PAOTs (People-at-one-time). During high snow years the area would likely be used at 60% capacity, or 40 PAOTs. With increased advertisement, the District has been recieving requests for information about ski conditions. The Winter Sports Group, Ochoco Nordic Club and other local publics have indicated a desire to expand the trail system both at Bandit Springs and on other areas of the district. Although interest in the area is growing few people have come due to lack of snow. The Bandit Springs State Rest Area is extensively used as a rest stop/ picnic area in the summer. This Rest Stop will be redesigned by the Oregon State Highway Division in 1995 to include more modern toilets and increased parking.

In answer to the first marketing question: **Yes, there is demand for cross- country skiing close to Prineville, Oregon.** During high snow years the existing demand would be met with existing facilities. Due to unpredictable snow years, any real increases in demand cannot be measured because they cannot be separated from affects of snow conditions. This observation lead to the first major project conclusion.

If trails are to be developed in the Bandit Springs area they should be multi-season use. With unreliable snow conditions, investment in constructing only winter ski trails is risky.

Determining Forest Land Use Allocations

After determing if there is demand for winter or summer sports, Jensen, Raab and others suggest that the next step in the planning process is to determine the Land Management Plan Land Use Allocations for the area. A review of the Ochoco National Forest LMP (1989) revealed that the Bandit Springs area has four land use allocations. These are: (1) the Bandit Springs Recreation Area, (2) U.S. Highway 26 visual corridor, (3) Summit National Historic Trail, and (4) General Forest. The Recreation Opportuntiy Spectrum for Allocation One is semi-primitive nonmotorized. For allocations Two and Three it is Roaded Natural and for the General Forest allocation; Roaded Natural to Roaded Modified. Visual Quality Objectives for allocations One and Two are Retention, and for the Allocation Three, Preservation. As explained later in this chapter, the original project boundaries were much larger than final boundaries due to lack of time and the intensity of project design. The final project boundary included only Allocation One, Bandit Springs Recreation Area.

The desired future condition of the Bandit Springs area is described in the Ochoco LMP as "an important winter sports use area on the Forest, as well as a setting for year-round recreation activities, including: environmental education, mountain bike riding, hiking, hunting, and horseback riding. Developments to accommodate a broad spectrum of nonmotorized recreationists' needs will be built to enhance their experience. Emphasis will be on enjoying the natural scenery...." (pg. 4-77).

Vegetative management within this area is described in the LMP as follows: "periodic manipulation of vegetation to meet recreational and visual objectives for the area will be apparent to the users. Timber stands will be managed to develop and maintain resistance to catastrophic events that would detract from the recreation experience.....Manage ponderosa pine to encourage large trees and open park-like stands. Manage mixed conifer for a range of species with emphasis on werstern larch where possible."(pg 4-77)

Clearly, Land Use allocations for the Bandit Springs area promote the development of year-round recreation trails, with emphasis on nonmotorized uses. Field verification of the terrain and vegetation revealed excellent terrain for skiing, hiking, mountain biking, and horseback riding.

Defining the Product

As stated in Chapter III, three products were desired from the Bandit Springs area. These were development of an "outstanding" semi-primitive nonmotorized recreation experience, enhancement of forest health, and perpetuation of a visually appealing old-growth forest. Aerial photos, topographic maps and field reconnaissance were used to further define the attributes of the Bandit Springs area that could help produce the desired product. These attributes are listed in Table 3.

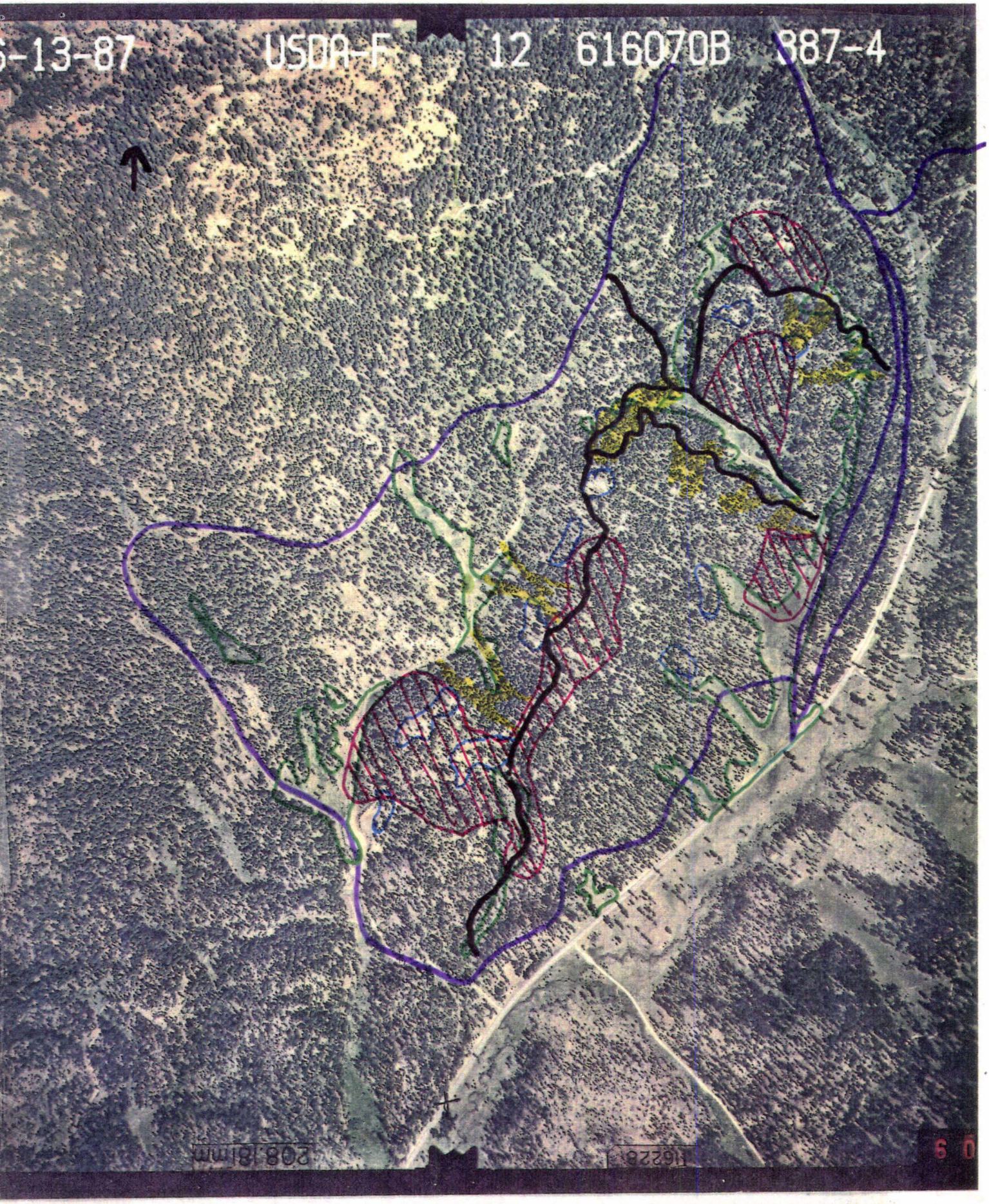
TABLE 3. ATTRIBUTES OF THE BANDIT SPRINGS RECREATION AREA

1. Old-growth ponderosa pine forest.
2. Open meadows of many sizes and shapes.
3. Meandering streams including McGinnis and Cornez Creeks.
4. Mixed conifer forest adds diversity to open pine stands.
5. Bandit Springs State Rest area provides easy parking and access.
6. Bandit Springs SnoPark provides adequate winter parking.
7. 11 miles of existing ski trail and some established use.
8. An existing ski shelter provides a good destination point.
9. The average 5,000 ft. elevation has potential to provide adequate snow at least every other year.
10. 25 miles east of Prineville and 15 miles west of Mitchell.
11. Mt. Bachelor Academy, a private wilderness high school is located here.
12. 1 mile from Forest Service campground, Ochoco Divide.
13. A historical trail, called the Summit trail passes through this area.
14. There is a local legend about a thief and his horse hiding in these woods, thus the name, Bandit Springs.
15. An historic cattle stock driveway meanders through this area.
16. Mill Creek wilderness is located on the areas northwest boundary.
17. Easy access off US. Highway 26.
18. Wildlife includes elk, deer, coyote, white-headed woodpecker, pileated woodpecker, and owls.
19. The sensitive plant species of mariposa lily is found in the area.

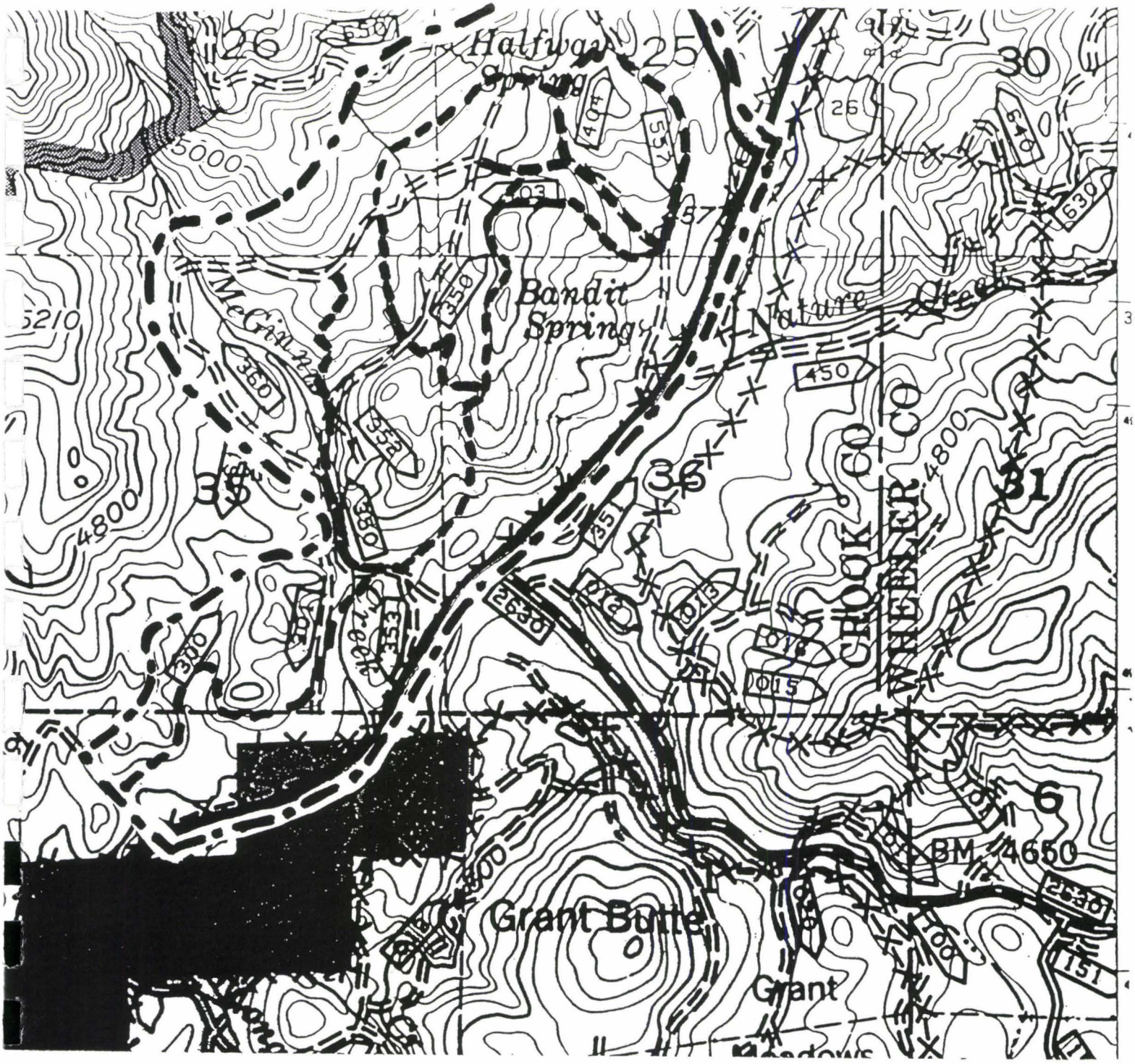
Product Delivery - Designing the timber harvest treatment areas

The products of recreation, forest health and visual quality were delivered by designing a timber sale. First, the area was delineated on an aerial photo (Map 1) and topographic map (Map 2). Next, attributes of the planning area, detailed in Table 3, were highlighted on Map 1. Proposed trail routes were drawn on the map. The trails were then flagged on the ground. Using an clinometer, grades were field checked. Other trail routes presented themselves at this point and some were rerouted to highlight views and changes in forest type. Several trails appeared unfeasible on the ground and were dropped from further consideration. It also become apparent that I would not have time to lay out all the desirable trails by spring of 1991, so the project scope was narrowed to the area between Forest Road 27 and McGinnis Creek.

Improving forest health was a major concern in this area. The Ochoco LMP states that ponderosa pines will be maintained at a 250 year rotation with a target diameter of 30". Mixed conifer stands in this area will be managed on a 200 year rotation with a target diameter of 27". Forest timber stand exams from 1978 showed a fairly healthy forest with minor root-rot pockets. Field verification of these exams painted a very different picture. The mixed conifer stands on the north slopes had high mortality and very large root-rot areas. It appeared that much of the mixed conifer understory was becoming infected and the forest had little chance of actually growing to 200 years of age and reaching a 27" diameter. At this point I arranged a site visit with the District Silviculturist, Nick Giannettino; Forest Entomologist, Andy Englitis; and Forest Pathologist, Helen Maffei. They confirmed my suspicions and emphasized the importance of treating the north slope fir stands to correct these conditions (see Appendix C for a detailed report).



MAP 1. Aerial photo of Bandit Springs area including meadows, vistas, existing and proposed trails.



MAP 2. Topographic Map of Bandit Springs Project Area.

KEY:

project area boundary

original proposed trails

The south facing ponderosa pine stands were in a very healthy condition. There was some overstocking due to fire suppresion. Some of these areas needed precommericial and commercial thinning. Both the diseased mixed conifer stands and overstocked ponderosa pine stands are identified on Map 3.

Suggested silviculture treatment for the mixed conifer stands are small patch clearcuts with planting of disease resistant species such as larch and ponderosa pine. A sanitation salvage of dead and highly infected trees is also recommended. Treatment for ponderosa pine includes small patch opening where trees are encroaching on meadows, thinning of the overstocked understory, and commercial thinning of 20% of the overmature stands. This will allow for growth of a replacement stand when the old yellow-bellies die.

Retaining the old-growth character of the area is possible, but challenging. In my opinion, leaving the north slope fir stands untreated will result in large areas of bug killed trees with excessive amounts of down woody debri on the forest floor. The forest will not look visually appealing until a forest fire removes this excessive built up. Even then, the burned area would not look appealing for many years. Therefore, I would recommend changing the visual management objective on the north slope stands to Partial Retention. This would allow for more vegetative manipulation, removing bug killed areas and replanting with species not susceptible to insect and disease.

The presence of meadows throughout the area does offer a solution to the landscape problem. By blending treatment units on the north slopes into the meadows, the units will not be visible to the casual observer in the long run. Slash treatment is also important. Tractor or hand piling of slash must be done as soon as possible after timber harvest. Make small slash piles that can be burned with a minimum of disturbance to the remaining vegetation.

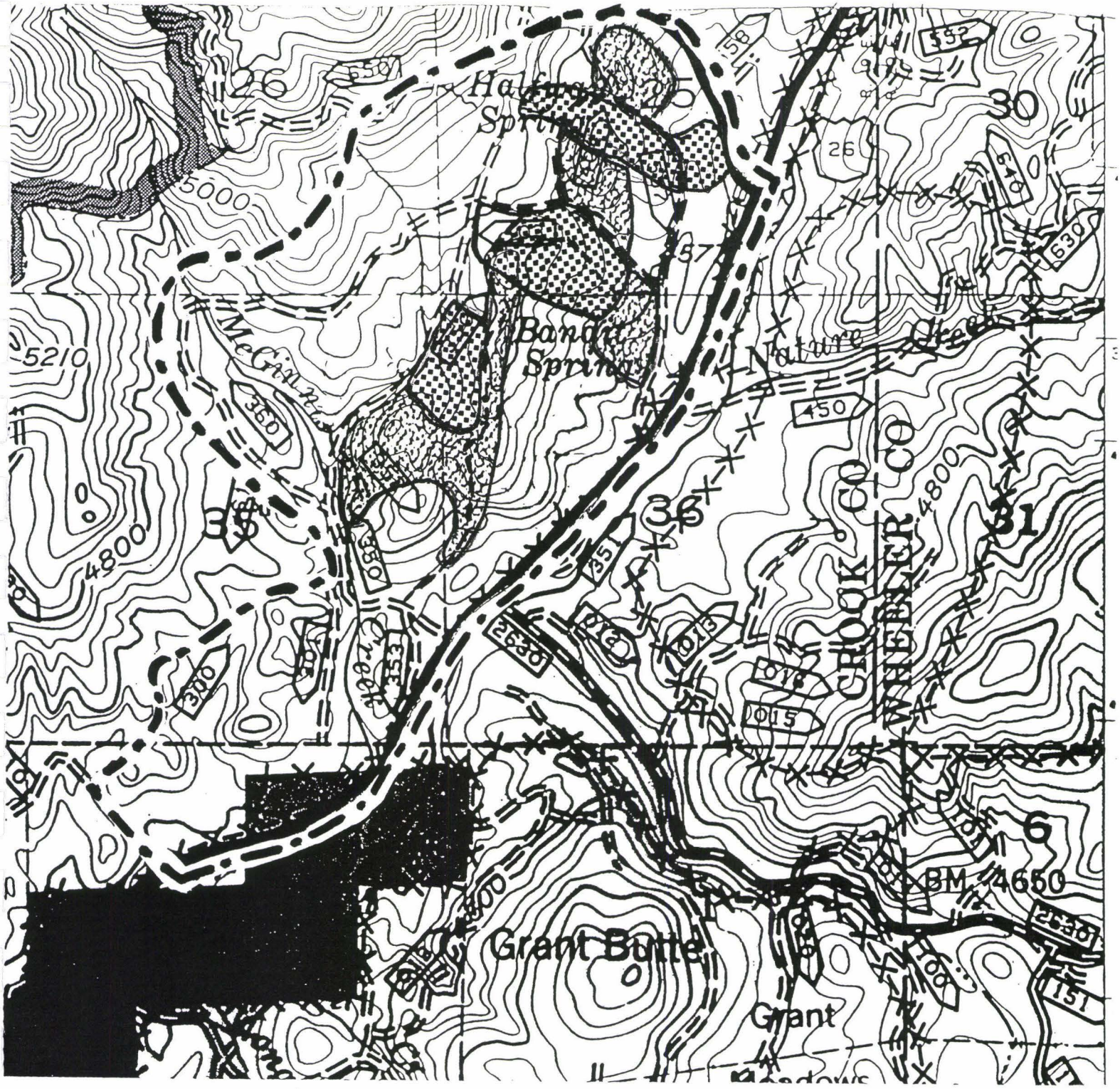
Stump height is also important. In highly visible areas along the trail, stumps should be cut under snow depth. In Bandit Springs this means a 1 foot stump height or less is desirable. Small patch clearcuts of 2-5 acres can be designed to create Frado's "terrain gardens". They will allow opportunties for telemark skiing and snowplay, as well as allow areas to be converted to disease resistant stands. Figure 1 illustrates a typical telemark hill.

Retain the old-growth character of ponderosa pine by reducing stand density in 20% of the area, by 20%. This will allow a replacement understory to be established. Marking guidelines should include retaining what I call the "fairy ring" character of the pine stands. Fairy rings are groups of old trees growing in a tight circle. They may appear to be overstocked to a silviculturist, however, to a recreationist they hold a sense of mystery and community. Figures 2 illustrates a typical section of trail through ponderosa pine forest and is also applicable to mixed conifer.

Trail Design

The Bandit Springs terrain is suitable for tractor logging. Tractor trails are the path the logging equipment travels to access the timber stand. The tractor is about 10 feet wide and its resulting path is about 12 feet wide. Skid trails are the path the logs are pulled on to reach the tractor. The maximum reach from the piece of logging equipment to the tree being removed is about 75 feet and are usually less than six feet wide (Friesen). Cross-country ski trail clearing widths vary from 6 feet to 20 feet. The tractor trails can be used for ski trails and the skid trails can become part of the trail route as well. This would allow variation in trail width from 6-12 feet, creating a diverse and natural appearing route.

Although winter trails do not need a scalped tread, only a cleared area under 7% sideslope, summer trails do need a defined tread. Mountain bike trail standards are a 4-8 foot clearing width with between a 1-2 foot tread. Horse trail standards include a 3-8 foot clearing width with an 18-24 inch tread. Hiking trails



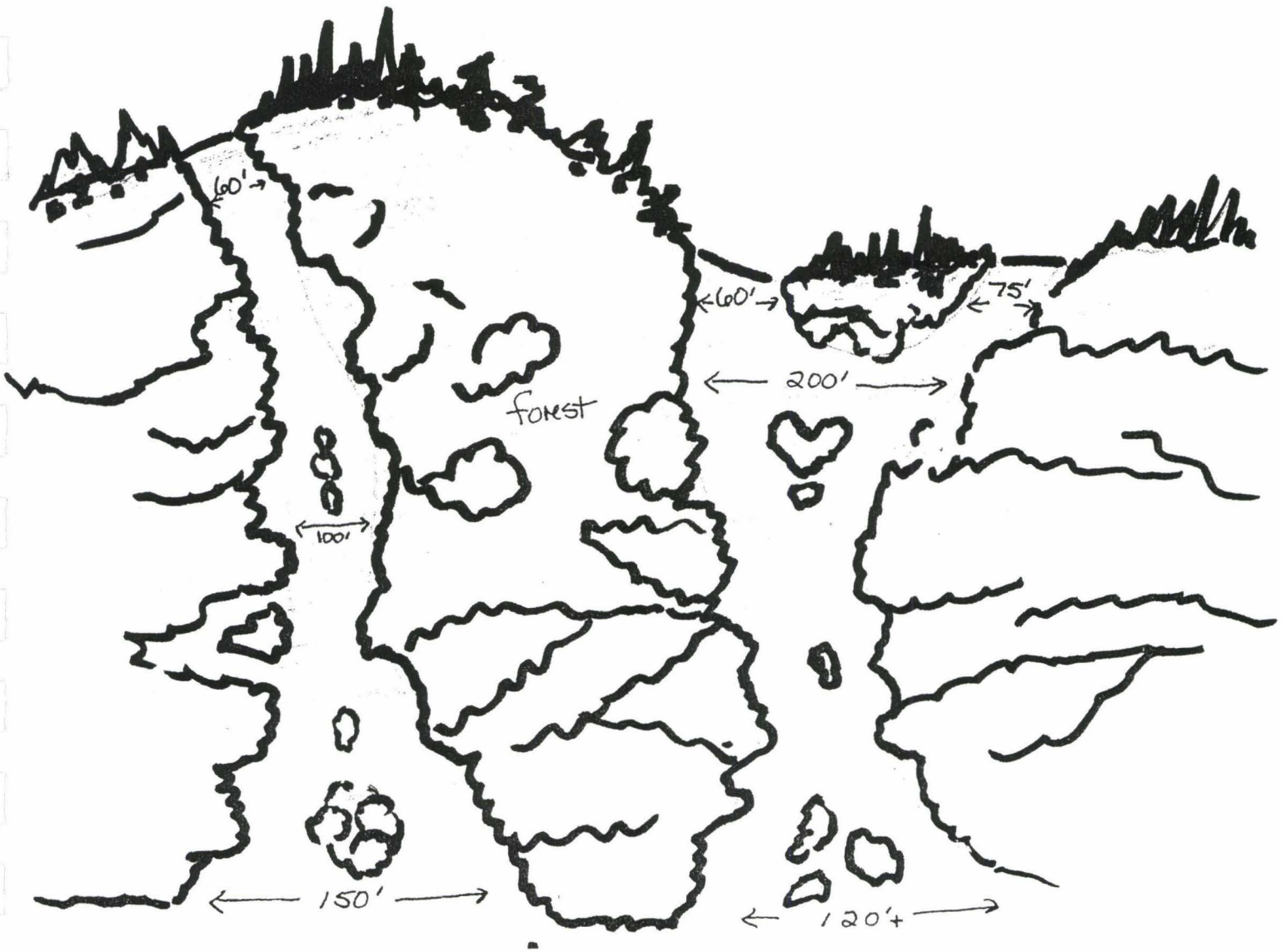
MAP 3. Mixed conifer and ponderosa pine timber stands needing silvicultural treatment within the Bandit Springs area.

KEY:

overstocked ponderosa pine

diseased mixed conifer

Figure 1. Typical design for telemark hills on north-facing mixed conifer slopes.



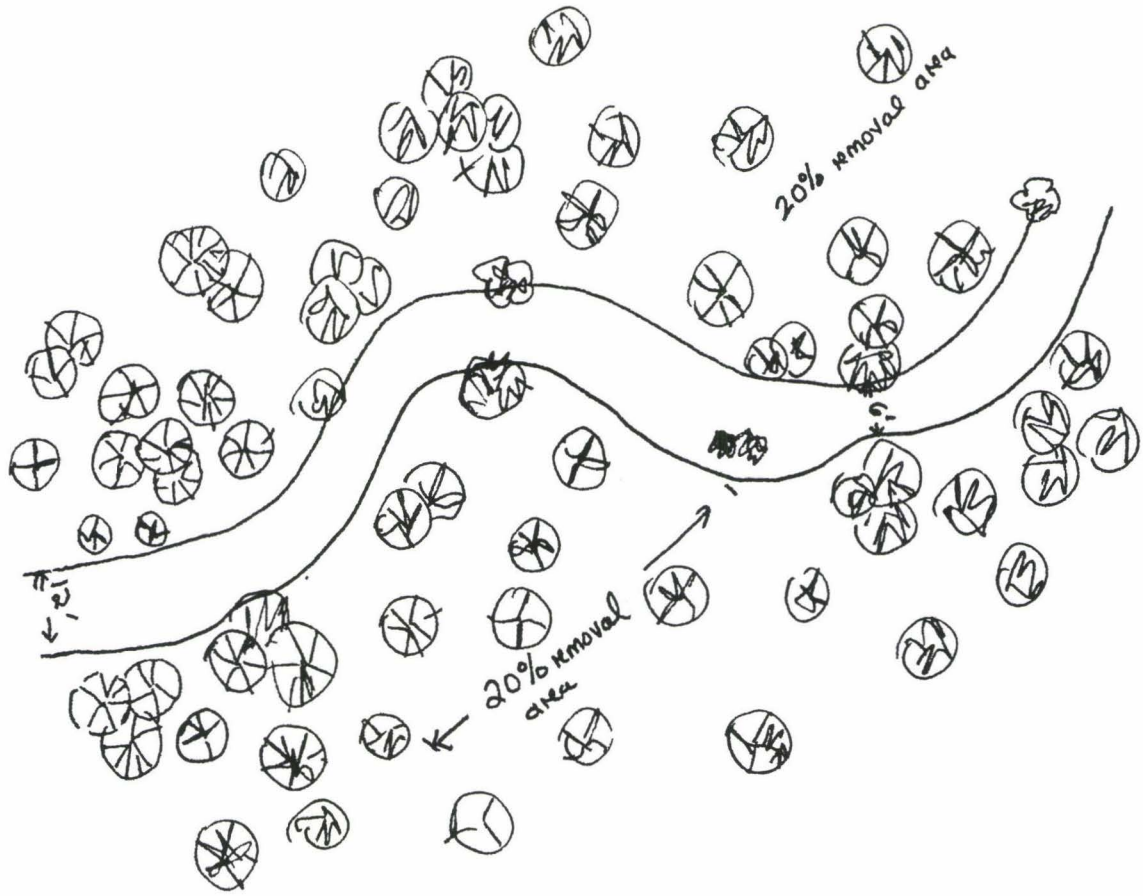


Figure 2. Vegetative treatment along a typical section of cross-country ski trail through ponderosa pine forest.

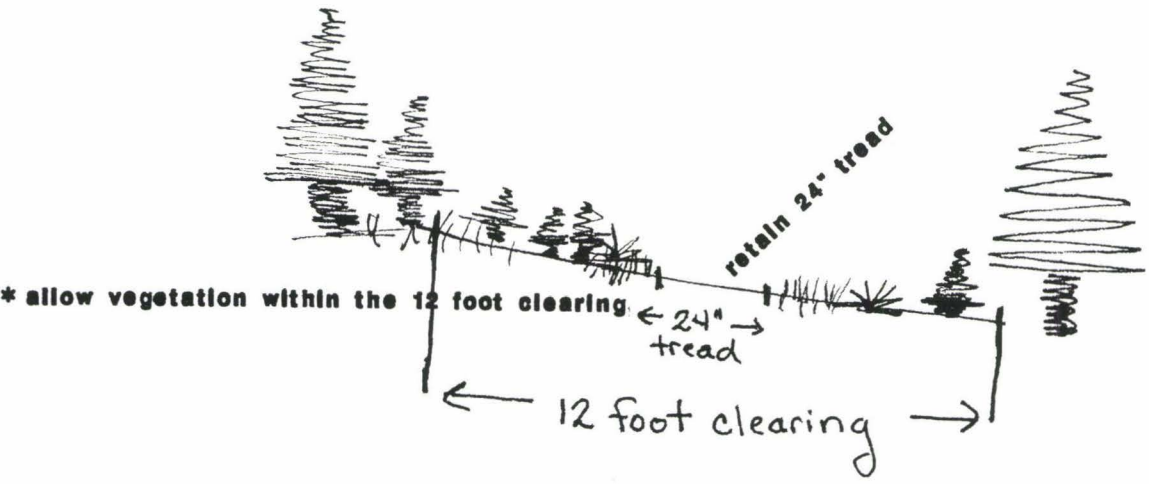


Figure 3. Cross-country ski/ mountain bike/ horseback trail maintenance standards.

standards for semi-primitive nonmotorized areas include a 3-4 foot clearing width with 1-2 foot tread (see Table 2). Using the concept of the Recreation Opportunity Spectrum, mountain bike and horseback riders will experience a semi-primitive experience on a tractor constructed ski trail. The trail would meet Easy to More Difficult trail standards, provided grade is kept under 7%.

Hikers expecting a primitive experience on these ski trails would probably be disappointed. A 6-12 foot wide trail does not meet the hikers expectations in a semi-primitive area. Expected trail width is between 1-2 feet. However, these trails would provide an "outstanding" hiking experience in a Roaded Natural setting with a rating of Easy to More Difficult. Campers from Ochoco Divide campground may enjoy hiking these trails if they are expecting a Roaded Natural experience prior to the trip. This could be accomplished by a brochure in the campground.

Properly defined trail maintenance standards may allow 12 foot wide ski trails to become semi-primitive summer hiking trials. By allowing grasses, schrubs and small trees to grow on the tractor road or skid trail a more natural appearing forest will result. Maintaining a 24 inch tread within the 12 foot clearing width will allow all summer nonmotorized uses. When the vegetation outside the maintained tread reaches a point where it intercepts snow, it should be removed or cut back (see Figure 3).

Having reviewed many ski trails in the Pacific Northwest I have concluded that clearing and tread width should vary by ROS class and canopy conditions, but we often do not follow these standards. A wider trail is needed in dense mixed fir stands to reduce canopy interception of snow. However, anything over 12 feet begins to feel like a road. A 6-foot clearing width gives a sense of enclosure and a more primitive experience. A trail varying from 6-12 feet would allow snow accumulation and a semi-primitive experience.

Landscape Management Guidelines

Three forests I visited constructed cross-country ski trails through timber sale design. The trails laid out on the Bend Ranger District up to Swede Ridge appeared to give thorough consideration to landscape design. The trail width varied from 8'-20' and skirted clearings formed by an overstory removal and small patch clearcut. The four to six foot snow depth covered all stumps. These clearings actually added to the diversity along the trail. Other parts of the trail went through old-growth fir forests, the trail being created by the narrow access road.

The two other sales areas I reviewed did not have specific criteria for landscape design. In one, three clearcuts were created to provide telemark ski opportunities but unit edges were not feathered or blended with the surrounding landscape. It is very important to clearly state landscape objectives in the timber sale and carry these through into the marking guidelines. This practice provides a common understanding throughout the process.

Landscape criteria for the Bandit Springs area includes the following:

1. Keep the tractor on the marked trail route. As trees are cleared for the access road, keep smaller non-merchantable trees in place near the clearing limits. Remove no more than 20% of the timber outside the 12 foot clearing along any 1 mile of trail, as illustrated in Figure 2.

2. Flag all skid trail locations prior to timber harvest. Where possible consider these skid trails as alternate ski routes for the future. Connecting skid trails between tractor paths will allow up to 300 feet of 6 foot wide trail. This will add to the diversity of the trail experience and keep it within semi-primitive trail guidelines.

3. When creating the telemark hills on north slope fir stands blend them with the surrounding terrain and meadows. Avoid sharp, boxy edges. Leave grouping of trees within the cleared run at midslope. Openings should not exceed 200 feet, and should vary from 50-200 feet. Openings should be widest at the end of the telemark ski run with at least 100 ft. of level ground at the bottom, so skiers can stop. Create at least one run under 15% slope (for beginner skiers), with the others averaging 15-45%. Replant these opening with western larch and ponderosa pine along the edges, leaving about a 50 foot unplanted swath for skiing during low snow years.

4. Natural regeneration will occur in the opening created for telemark skiing. This regeneration should be cut back so that the planted species of western larch and ponderosa pine can become established. The natural regeneration is susceptible to root-rot.

5. After ten years the planted telemark hills may become unskiable due to regeneration. At this point, reassess the success of this treatment and consider creating other telemark runs, while allowing the original runs to become forested.

6. In south slope ponderosa pine stands use a selection harvest. Remove trees with extensive mistletoe so it does not infect the understory. Keep groupings of "fairy rings" in at least 50% of the stand.

7. The Timber Sale Administor who oversees this logging operation will play a very important role. This person, as well as the logger, must clearly understand the recreation objectives. These people will be a critical element in the success of this project.

8. On Forest Service Road 350, near the new trail junction, create a landing. This will allow construction of a trailhead in the cleared area.

Follow-up and Evaluation

An Environmental Assessment must be completed before these trails can be built. The Big Summit Ranger District plans to incorporate project recommendations and trail design into the Marks Creek Environmental Assessment to be completed by June 1992. Topographic mapping should be used to locate the final trails. In addition, a landscape computer model such as Perspective Plot should be used to incorporate landscape management objectives into timber sale design.

Additionally, several follow-up plans are needed for the long-term success of this project. An interpretive plan which includes use of the Oregon State Rest Stop, the Sno-Park, summer trailhead, interpretive signing and a brochure is needed. A fire management plan that maintains the open ponderosa pine forest and existing meadows is also needed. Finally, the long-term success of this project should be evaluated using a monitoring plan that is part of the Ochoco National Forest Management Plan.

In order to evaluate the success of this "New Perspective" project, follow-up evaluation should include answering the following questions:

1. Did the slash treatment used result in a natural appearing forest within two years of project completion?

2. Is additional clearing or grade work needed along parts of the trail?

3. Did the telemark ski trail harvest units successfully blend with the natural landscape?

4. According to the perspective of hikers and skiers, does the ponderosa pine forest still retain "old-growth" character?

5. Did skid trails create additional ski or hiking routes that can be utilized?

6. Did timber harvest help improve forest health by reducing insect and disease problems? and finally,

7. Do people like hiking, biking, horseback riding and skiing this area?

CHAPTER V
CONCLUSIONS

New Perspectives in Forestry challenges forest resource managers to take an ecosystem approach to forest management. The Bandit Springs area was an excellent place to demonstrate this concept by combining timber stand treatment with creation of winter and summer recreation trails. In addition, preservation of the old growth forest character and its associated wildlife and botanical species is attained.

The three trails that result from this project will range from two miles of Easy trail to three miles of More Difficult trail. This trail system will accomodate a wide variety of users, including mountain bike and horseback riding in the summer. There are many interpretive opportunities that can be highlighted including old-growth ecosystems, meadows, sensitive plants such as the Mariposa lily, white-headed and pileated woodpeckers, deer, elk, and forest management techniques.

Defined landscape objectives appeared to be critical in the success of New Perspectives projects. Specific vegetative management guidelines must appear in both the trail objectives and the Environmental Assessment. These concepts should be predetermined and refined during trail layout. This will avoid misunderstandings during trail construction and assure that recreationists have a quality experience. When designing trails in old-growth areas such as Bandit Springs this step is critical in preserving the forest character. Monitoring people's perceptions of the area is important in determining the success of this undertaking.

The concept of Frado's "terrain gardens" is very similiar to small patch clearcuts. Telemark clearings were desired on north facing slopes because this is where the snow remains the longest. This also coincided with the need to treat the disease infested mixed conifer stands on the north slope. Since root disease is best treated by small clearcuts and a species change, the two objectives seemed well matched. Public acceptance of this practice should be measured after two years. We must be extremely careful not to use creation of telemark hills as an excuse to clearcut in a Retention area. In this particular case, from a silviculture point of view, we are probably not treating enough of the diseased stand. Success of reducing insect and disease problems should be evaluated over the next ten years.

I would also recommend changing the Visual Quality Objective of the mixed conifer stands in the Bandit Springs area. They are currently listed as Retention. My question is: Retention of what? In order to improve forest health and attain the desired future condition of 200 year old, 27" trees the Visual Quality Objective should be changed to Partial Retention on the north slope fir areas. This will allow additional vegetatative management that will achieve the desired future condition much quicker than the present conditions.

Additional recreation opportunities are still needed in the Bandit Springs area. A trailhead on Forest Road 350 should be built on the proposed landing site. Summer hiking trails are also still needed. A connecting route from Ochoco Divide campground to the Ochoco Way ski trail should be built. In addition, the maintenance standards illustrated in Figure 3 should be followed. Their success at providing a semi-primitive hiking experience should be assessed after five years.

In conclusion, with careful planning, "outstanding" recreation trails can successfully be created through timber sale design. Combining the objectives of recreation and sale planning allows for improvement of forest health, reduced recreation construction costs, and the use of an ecosystem approach to forest management.

Ideas to Consider Further

Having skied a wide variety of trails this winter I discovered very inconsistent rating systems and signing. Many trails labeled More Difficult were actually Most Difficult. Trails labeled Most Difficult were above and beyond these standards. I suggest either not marking these trails for winter use or developing another

category of ski difficulty called "backcountry." Backcountry would mean summer trails such as the Pacific Crest Trail, that are narrow and have hairpin turns. Visitors would then expect a very difficult ski and not be totally frustrated at this "most difficult" trail. I asked Dick Kendall what he thought of this idea and he preferred that we not mark these type of trails at all.

One additional suggestion I have is to reexamine the cross-country ski trail standards in FSH 2309.18. The summer trail criteria is very specific in terms of grade, tread and clearing width, turning radius, maximum sustained grade, ect. Ski trail criteria is not written this specific. The chart should be revised to include more specific criteria. This would help alleviate the problem of trails not being rated correctly.

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FORM B2 - VISITOR SITE SURVEY

SITE NAME:	DATE: Jan 19 time 10 to 1	WEATHER	SNOW DEPTH
Akalt creek		Sunny Little Breezy	Spotty

INTERVIEWER: D. H.

NUMBER OF VEHICLES CROSSING COUNTER: RECREATION: ——— 4 people camping
COMMERCIAL: ——— 2 Vehicles with snow

NUMBER OF RECREATION VEHICLES:

NUMBER OF ADMINISTRATIVE/ COMMERICIAL VEHICLES: 4 vehicles going on to walton lake

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A. Visitor's Experience and Present Visit

1. Which activities will you participate in at this site today?

(a) snowmobile
b. ski
c. snowplay
d. other

2. How long do you plan to spend purseing this activity today?

a. number of hours 10

3. How many times each year do you visit this area to a LOT? (use for summer recreation)

4. How many years have you been coming to this site in the winter? 12

5. How did you find out about this area?

6. How many people are in your group today? 23

7. What other activities do you participate in on the Big Summit District during the winter? hunting - looking for game animals

8. Did you have a particular reason for choosing this area today? yes

9. Since your first visit to this area, have you notices any changes in the conditions? YES ✓ NO_____ If yes, what excessive Logging

10. Have these changes affected your use of this area? YES ✓ NO_____

HOW? taken away the beauty of the natural terrain

11. On your visit today, did you encounter about the number of people that you expected YES ✓ NO_____ MORE_____ or LESS_____?

12. In terms of the ideal trip: would you prefer the same number of people yes more_____ or less_____.

13. Were other winter sports users a problem during your day here?

YES ✓ NO _____ public vehicles allowed to drive on snow covered roads that are used by snowmobiles in the winter

14. Do you like the fact that there are now plowed areas to park in?

YES ✓ NO _____

15. How do you feel about the SNOPARK permit system now in use in this area? DISLIKE _____ DON'T MIND _____ LIKE ✓

16. What other improvements would you like to see in this area for winter sports? Roads closed to public access in the winter - other than over the snow vehicles

17. Are there any other areas around here that you would like to have access to during the winter to pursue your activity? (You can show them a map of the district and point out Walton area, act).

_____

18. Is there anything else you would like to tell us about the winter sports program in this area? too much advertisement to bring in more recreationists - this will result in over crowding of our area.

POINTS TO REMEMBER

This ski area is located in a very challenging environment. Be prepared for changing weather.

* Always carry the following: Map, compass, flashlight, matches, knife, extra food and water, first aid kit, sun glasses and sun lotion, ski tip, extra clothing including rain gear, and a small piece of insulate pad for ground insulation.

* Show a friend a map of your planned route and let them know when you expect to return.

* Show courtesy to others in the area. Pack out all trash, burn only small quantities of wood in the shelter, bury human waste at least 300 feet from the shelter and leave your dog at home.

* If you feel lost, either stay where you are until help arrives or head downhill in a southeast direction. The highway is within 3 miles of almost every point in the Bandit Springs Nordic area.

* In case of an Emergency the closest public phone is at the Ochoco Ranger Station or the Ochoco State Park.

Welcome to

BANDIT SPRINGS NORDIC SKI AREA

Ochoco National Forest
U.S. Hwy 26, Prineville, Oregon

Oregon State Sno-Park Permits ARE REQUIRED.

Bandit Springs is located 28 miles east of Prineville, on U.S. Highway 26. Park at the Bandit Springs State Rest Area Sno-Park, one of three new Sno-Parks in the area.

These ever expanding trails are maintained by the local Ochoco Chapter of the Oregon Nordic Club. The trails, designed for beginning to advanced skiers, wind through open pine forests and dense fir thickets. If you have any comments or suggestions please contact the Big Summit Ranger District at (503) 447-9645.

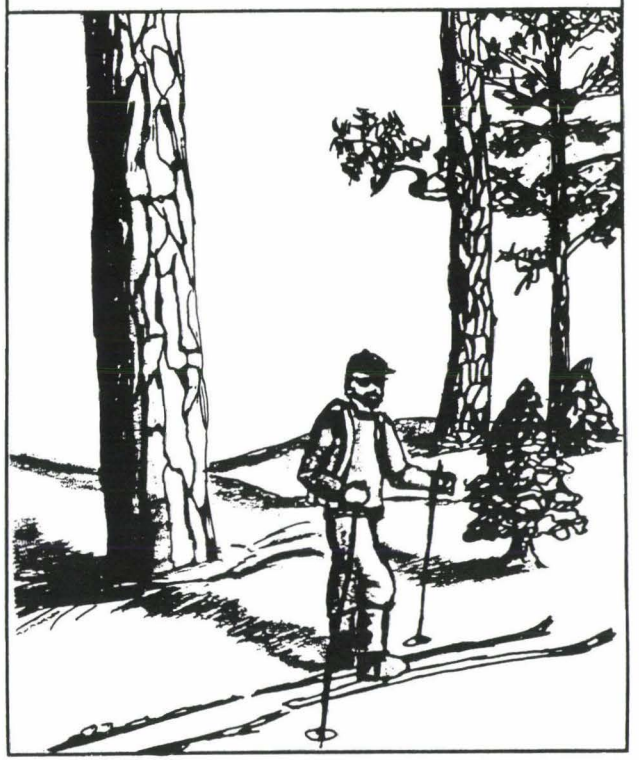
The Ochoco Nordic Club prints an annual Tour Schedule. Carpools form at 9:00 am, 205 N. Claypool across from the Arctic Circle. Membership is open to all skiers. Individual/$7 - Family/$12

Ochoco Chapter, Ore. Nordic Club
Route 1 Box 816-K
Prineville, OR 97754

OCHOCO NATIONAL FOREST

NORDIC SKI AREA

BANDIT SPRINGS



Pacific Northwest Region
USDA Forest Service

OCHOCO CHAPTER
OREGON NORDIC CLUB

Prineville-Crook County
Chamber of Commerce

Bandit Springs

SKI TRAILS

PONDEROSA LOOP

1.4 miles (2.2 km) EASIEST

This route heads northeast through open ponderosa pine stands for .8 miles and returns west. It is generally flat with a few short downhill sections near the end.

McGINNIS CREEK LOOP

4.2 mile (6.8 km) MORE DIFFICULT

Follow the Ponderosa Loop for .8 miles then head northwest. The trail becomes challenging with short uphill climbs and downhill runs that add spice to the trail. Intermediate skiers should have little trouble with this trail.

RIDGE CLIMB

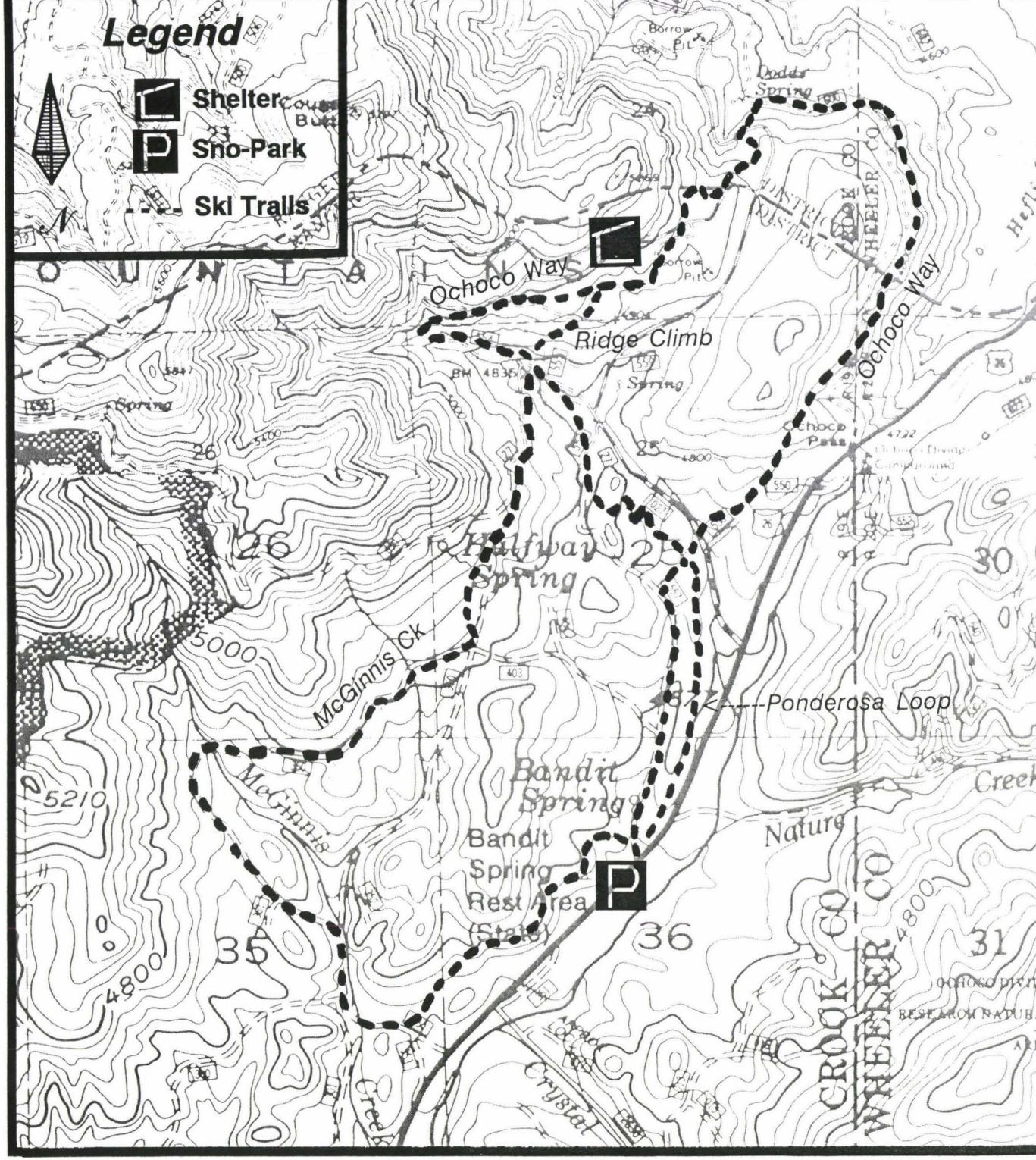
.5 mi. (.8 Km) MORE DIFFICULT

This trail follows McGinnis Ck. trail for 1.4 miles then takes off to the northeast. Look for blue diamonds on a hairpin turn. Ridge Climb accesses the snow shelter and connects to Ochoco Way. There are two short sections of moderately steep climbing and slopes for telemark skiing.

OCHOCO WAY

3.5 miles (5.6 km) MOST DIFFICULT

Takes off McGinnis Ck trail at end of Ponderosa Loop, crosses road 27 and heading N.E. over a foot bridge. The first quarter mile is a steep climb. There is a second crossing on Road 27 and an easy 1/4 mile ski to the Shelter. Not recommended for beginning skiers.



MOTORIZED USE RESTRICTED TO DESIGNATED ROUTES DEC 1 TO MAR 30

United States Department of Agriculture | Forest Service | Deschutes National Forest | 1645 Highway 20 East Bend, OR 97701

Reply to: 3400 Date: January 10, 1991

Subject: FPM Site Visit to Bandit Springs Planning Area

To: District Ranger, Big Summit RD

On December 3, 1990, Area IV FPM specialists Helen Maffei and Andy Eglitis visited the Bandit Springs Planning Area with Sue Kocis, Recreation Specialist from the District. Andy Eglitis visited another part of the planning area on December 17 with Nick Giannettino, District Silviculturist. The purpose of the site visits was to provide pest management input into the planning process for the Bandit Springs area.

Two distinct stand types were recognized within the Bandit Springs planning area. On northern slopes, the forest vegetation consists primarily of the mixed conifer type; stands are dominated by white fir and Douglas fir with some western larch. Ponderosa pine and larch now make up a small portion (primarily overstory) of these mixed conifer stands. They were once considerably more abundant but have become crowded out by the dense white fir understory which has developed in the absence of fire. The other primary stand type is pure ponderosa pine. These stands are dominated by larger trees, but most of them have a substantial understory of smaller-sized pines. In some cases, the stand structure is highly diversified with an abundance of intermediate and pole-sized trees under the larger overstory pines.

The current and predicted pest conditions in relation to the desired future condition are described for the two primary types of stands:

Mixed Conifer: Stands in this type do not nor are they likely to meet the desired future condition as a result of the impacts of a number of forest pests. The most prominent of these as a mortality agent is laminated root disease (Phellinus wierii). As a result of this root disease, the ability of the area to support a vigorous forest of host trees (white fir, Douglas fir) for any length of time is nonexistent. At present, numerous disease pockets are evident throughout the northern slopes and considerable mortality is occurring throughout the area as a result of this disease (20 percent of the total trees/decade). Many of these pockets contain sapling sized fir regeneration which became established after the earlier fir died of root disease but within 20 years these too will begin to die. A scattering of mature resistant trees like larch and ponderosa pine are present in the overstory. Unfortunately, the larch component is heavily infected with dwarf mistletoe and is dying at an even faster rate than the fir. The scattered overstory pine appear to be in good condition.

In addition to degrading the visuals of the area (thus the recreational experience), the extensive mortality is resulting in areas of jackstrawed trees which may create hazard, cause extra trail maintenance (if located near the trails) and result in regeneration problems and buildup of hazardous fuels.

Even if root disease were absent, the fir component of the stand is severely infected with the stem decay, Indian paint fungus (Echinodontium tinctorium). Very high levels of cull are present in all size classes larger than large poles. Latent infections are probably present in the smaller trees rendering them unmanageable. Trees in this condition experience a high degree of branch and top breakage and could become a problem both in terms of hazard and trail maintenance if they are located near ski trails.

There is some evidence of damage to white fir and Douglas fir by past infestations of the western spruce budworm (Choristoneura occidentalis), but damage is not as severe as in other areas of the Forest. The Douglas-fir beetle (Dendroctonus pseudotsugae) and the fir engraver (Scolytus ventralis) which often follow budworm outbreaks have also had minimal influence on the stands in the Bandit Springs planning area.

RECOMMENDATIONS. It is highly unlikely that the desired future condition of large old growth could be met with the trees presently occupying the site. In fact, the character of the vegetation will continue to move further away from what is desired as mortality from the various pests, especially the root disease, continues and begins to affect younger and younger trees. The overstory larch and pine will eventually die with no replacements because of the density of the fir understory. Very little success would be expected from any silvicultural treatments which attempt to restore vigor to the present stand. At this point, the best option for achieving the condition is initiating a series of regeneration treatments which will result in gradually re-introducing the seral species (larch and pine) as dominant components of the forest. Once these species become established several management actions will be necessary to prevent the same cycle, as we have seen here, from repeating itself including: (1) stocking level control and (2) removal of such risks to the reproduction as overstory larch infected with dwarf mistletoe.

Ponderosa pine: At the present time, these stands fully satisfy the desired future condition of stands composed of large yellowbarks. Furthermore, there is no pest activity at present which would jeopardize this condition in the short term. Scattered bark beetle activity has occurred in the past but at endemic levels.

Pest effects may hinder maintaining this condition over the long term. Bark beetle activity can be expected to increase in both the understory and overstory pines. Overstory pines might be attacked at a higher rate than present by the western pine beetle, if they experience stress from competition for light or moisture. Many of the trees in the Bandit Springs planning area would be rated as moderate to high risk and some mortality can be expected to occur in the next decades if no silvicultural treatments are carried out.

Of greater concern in the long term is the threat of bark beetle attack to replacement trees. There is evidence of very recent bark beetle attacks in the understory where small trees are growing under crowded conditions. The dense young stands are now susceptible to attack by the Ips engravers and will later be attacked by the mountain pine beetle if there is no stocking level control. An unfortunate side effect of bark beetle attacks in the young understory is that the beetles thin these thickets from above and remove many of the intermediate trees which would otherwise replace the overstory pines. This effect could lead to a two-storied structure where residual trees are either

very large or very small, rather than the more desirable state where a range of sizes are presently capable of replacing overstory trees as they slowly die from natural mortality agents.

RECOMMENDATIONS. These stands can be managed on a long rotation and bark beetle effects can be minimized if some stocking level control is done, and if high-risk trees are periodically removed. We recommend that at the very least, some thinning treatments be carried out to favor and maintain the larger understory trees. If these trees are to be future replacements for the present overstory pines, they must be protected by periodic removal of smaller competing pines.

/s/Helen Maffei

HELEN M. MAFFEI
Zone Pathologist

/s/Andris Eglitis

ANDRIS EGLITIS
Entomologist